The Use of Solitons as an Efficient Converter of Electromagnetic Energy into Kinetic Energy for Near-Earth Object Repulsion

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Introduction

The challenge of efficiently delivering meaningful amounts of kinetic energy to a massive object one wishes to prevent from impacting the surface of the Earth has been a formidable one, with a great many inadequate if diverse approaches having already been suggested. While the chances of an extinction level event are quite low, it would be nice to have a viable contingency plan ready in the event it is needed.

Abstract

Traditional kinetic impactors must be launched a decade or more in advance to be effective and in most cases, estimates as to object trajectory are so inaccurate that attempts at deflection would be just as likely to cause a collision than prevent one. Provided an object is detected and deemed likely to impact the Earth, however, an efficient means is needed to change the object's trajectory.

The use of micro-gravity generates too little force, the use of nuclear weapons, even if enhanced by antimatter would generate massive amounts of radiation that would do little but temporarily heat the object and render it radioactive. Any strategy based upon generating a heat differential with a spread focus laser would not generate sufficient repulsive force. Microwaves are one possible heat source, but they tend to bounce off of metallic objects. Thus, my own Resonance Acceleration by Spin Attenuation technology, while great for rapidly cooking food, would not work with an iron-core asteroid; the very sort that poses the greatest risk. Asteroids simply made of rock tend to break apart or detonate in the atmosphere, but iron-core asteroids of sufficient size can survive re-entry to directly impact the surface.

Considering this, it is safe, in my view to develop an approach that assumes that the object will be made of some combination of iron, nickel, or cobalt, all of which happen to be ferromagnetic. These sorts of asteroids are most common and given that knowledge, with the right kind of detection grid, these objects can be deflected using a new approach.

One of the fundamental difficulties with approaches involving the emission of electromagnetism of any sort is that electromagnetism tends to be converted into heat, reflected, or to pass through an object. Although heat is fundamentally vibrational and certainly qualifies as having kinetic properties, before radiational cooling can propel an object heated on a single side to any great extent, the object will cool due to a fourth type of cooling; the sort that I personally postulated to exist and still awaits experimental verification. That cooling is the primary reason objects in space tend to be cold, even in a vacuum where there is nothing to conduct heat away from an object and at

temperatures where radiation of IR light could charitably be deemed marginal. That cooling is caused by the repulsion of a positive nucleus by its own spherical electron cloud toward the center point in the middle of the cloud; a kind of anti-pendulum effect caused by the constant inward flow of neutrinos toward protons. This sort of cooling is the reason we live in a primarily cold Universe and it is also the reason why asymmetrical heating approaches for NEO deflection cannot work.

Taking that into consideration and given that the most dangerous of these objects are made of ferromagnetic materials, the delivery of pure magnetism is an appealing option for exerting a strong force against a metallic object. This approach is not as simple, however, as pushing a paperclip with a refrigerator magnet, although, when it is done correctly, the effect is nearly as dramatic.

The reason you can push that paperclip with a fridge magnet is that although the magnetically unaligned clip is being pushed forcefully, its own properties cause magnetism to be reflected back, pushing in equal proportion against the magnet. The reason free energy seems to be generated in that scenario is because force in the form of a slight push with your hand holds the magnet in place and it's actually that force that creates the illusion that free energy is being generated. Thus, we need a system based upon magnetically pushing an object (and thus its whole atoms and not merely nuclei (heat generation)) and a means of doing this that does not cause magnetism to be reflected in an equal but opposite reaction.

In the case of the specialized electromagnetism called a soliton wave, however, free electrons spinning in alternating directions and lacking a property of frequency or phase are better able to resist resonance with various materials. When interacting with a massive iron body, however, the soliton wave would be converted in equal parts, I predict, into electricity and kinetic energy. After a metallic body accumulates a strong negative charge, a greater proportion of the energy of each wave would be converted into kinetic energy. Where ordinary electromagnetism tends to resonate with ions, direct electron-electron interaction is rare and interactions would normally result in reflection of EM. Soliton EM's ability to penetrate a certain distance into a metallic body before denaturating mean that something quite unique can happen.

The uniformly rotating electrons of each slice of the overall wave push against any metallic object in their path and the force is carried in the direction of angular momentum. Regardless of which slice of the wave one is referring to, since both spin either down-up or up-down but with the north and south poles of the electrons facing the direction of momentum, force is exerted against the metal in front of the wave. As the electrons pass through the metal inch by inch, the strength and integrity of the wave decreases. Although some force is exerted in the backward direction, there is always more force exerted in the direction of angular momentum because the wave gets weaker as it travels deeper. With soliton emitters, since south and north alternate constantly in mid-flight, the metallic body will not become magnetically polarized.

Thus, if a ring-configuration soliton emitter powered by plutonium battery

were parked on or above the surface of an asteroid, it could generate wave after wave of solitons. The pent up energy in the plutonium when converted into kinetic energy is more than enough to push the asteroid out of the way in a matter of about 4 weeks rather than the decade needed for a kinetic impactor's nudge to be effective.

That same plutonium incorporated in a nuclear blast in the vacuum of space would release neutrons and X-Rays that would resonate with the matter near the surface of the asteroid and heat it somewhat, but the parts of that energy not immediately radiated in directions other than the asteroid would be slowly chipped away by the anti-pendulum neutrino influx cooling effect. Fissioned nuclear materials release energy almost exclusively as radiation and heat. The immense energetic potential of fissionable elements is wasted when used in the form of a bomb.

Take that same energy, however, and focus it on making soliton waves, and a high proportion of that energy can be converted into unidirectional angular momentum A.K.A. kinetic force.

A high proportion of the energy tends to always push in the direction of angular momentum because the soliton wave only transiently magnetizes whatever is in front of it due to the rapid alternation of the individual electrons. Keeping the iron from becoming polarized is essential for the effect to be maintained.

The actual amount of force exerted by a single such wave may surprise you. A single wave a few feet in diameter can knock picture frames (if they have a metallic component) off of walls and can even knock pots and pans off of tables.

Thus, even in a body with an equivalent weight of several million tons, if your soliton emitter can pulse ten times per second exerting about enough energy to move a one pound object a couple of feet here on Earth, an 8 million ton asteroid could have its trajectory changed by 1/10th of one degree of angle in about 41 days using only a three-foot diameter ring-configuration soliton unit pulsing 10x per second.

Factors such as the rotation of the asteroid would need to be accounted for since one would want to make sure that the force was being applied in the desired direction, but these technical challenges should be trivial now that the right strategy is known. In fact, the spacecraft equipped with the emitter would not even need to land on the asteroid; soliton waves are capable of traveling quite a distance. Minor adjustments could be made which would allow the craft to constantly maintain the appropriate positional relationship to the object in a high orbit.

Conclusion

This approach would be safer and most likely more effective than attempts to harness antimatter and by far more effective than other approaches. For any deflection technique to be effective, a detection mechanism capable of warning at least a few months in advance of an impact is essential and would

likely entail forward deployment of radar units in orbit around each of the planets of our solar system. It would furthermore be advisable to forward-deploy the soliton emitting magnetic repulsion craft strategically around a number of planets to reduce response time.

Note: Just three days later, on 5 September 2022, my mind already on the topic of Near Earth Object deflection, developed the concept for photo-magnetic propulsion which, amongst other things, can be used to accelerate kinetic energy impactors to such velocities that the above approach is rendered obsolete. That concept was usurped by an unknown party and some months later, DARPA announced the CRANE initiative which is linked to NASA's DRACO initiative.